WHAT IS CLAIMED IS:

1. A method of constructing a progressive mesh, the method comprising the steps of:

(a) constructing a cluster from each vertex in a single resolution mesh constituted of a plurality of vertices, constructing an expansion operation by connecting the vertex with its adjacent vertices, and calculating a cost of the expansion operation;

(b) repeating the expansion operation with the lowest cost for constructing a forest, wherein the expansion operation (i, j, k) with the lowest cost is performed, with i, j, k as vertices in the mesh, vertex k as a root of the cluster after the connection until the first termination condition is fulfilled;

(c) performing a clustering simplification to each cluster c(t) in the forest above, merging non-root vertices to t, wherein t is a representative vertex of the cluster c(t); and

(d) repeating step (b) and (c) until the second termination condition is fulfilled, so as to produce a simplified mesh.

2. The method of claim 1, wherein the step of constructing the forest further comprising steps of:

obtaining an expansion (u, v, v_0) with the lowest cost, wherein u, v, v_0 are vertices in a single resolution mesh

setting the expansion (u, v, v_0) as disabled if the vertex u has combined with a cluster c(x) or an expansion (v, u, x) has been carried out, wherein x is any vertex that differ from the vertex v_0 in the single resolution mesh.

3. The method of claim 2, wherein the step of constructing the forest further comprising a step of:

recalculating the cost of expansion operation without carrying out the expansion operation if the cluster $c(v_0)$ is combined with other vertices after the expansion (u, v, v_0) is constructed.

4. The method of claim 2, wherein the step of constructing the forest further comprising a step of:

converting the expansion (u, v, v_0) into (u, v, w) and recalculating the cost of expansion operation without carrying out the expansion operation (u, v, v_0) if the vertex v_0 is merged to a cluster $c(w)$, wherein w is any vertex that differs from vertex v_0 in the single resolution mesh.

5. The method of claim 3, wherein the step of constructing the forest further comprising a step of:

converting the expansion (u, v, v_0) into (u, v, w) and recalculating the cost of expansion operation without carrying out the expansion operation (u, v, v_0) if the vertex v_0 is merged to a cluster $c(w)$, wherein w is any vertex that differs from vertex v_0 in the single resolution mesh.

6. The method of claim 2, wherein the representative vertex t is combined with each vertices outside the representative vertex t when the clustering simplifiaction is performed.

7. The method of claim 6, wherein a plurality of vertices for constituting a resolution mesh forms a plurality of triangles, and the step of performing the clustering simplification further comprising a step of eliminating those triangles using two or more vertices in the cluster $c(t)$.

8. The method of claim 6, wherein a plurality of vertices for constituting a resolution mesh forms a plurality of triangles, and the step of performing the clustering simplification further comprising a step of moving the corner of the triangle which uses a non-representative vertex t in the cluster to where the representative vertex is located.

9. The method of claim 7, wherein the step of performing the clustering simplification further comprising a step of moving the corner of the triangle which uses a non-representative vertex in the cluster c(t) to where the representative vertex is located.

10. The method of claim 5, wherein the step of performing the clustering simplification further comprising a step of merging each vertices outside the representative vertex t to t.

11. The method of claim 10, wherein the plurality of vertices for constituting the resolution mesh forms a plurality of triangles, and the step of performing the clustering simplification further comprising steps of:

eliminating those triangles that use two or more vertices in the cluster c(t); and

moving the corner of the triangle which uses a non-representative vertex in the cluster c(t) to where the representative vertex is located.

12. The method of claim 1, wherein the clustering simplification further comprising a step of saving each round of simplification as a simplification record.

13. The method of claim 12, further comprising a step of converting the simplification record into a refinement sequence.

14. The method of claim 9, wherein the clustering simplification step further comprising a step of saving each round of simplification as a simplification record.

15. The method of claim 14, further comprising a step of converting the simplification record into a refinement sequence.

16. The method of claim 11, wherein the clustering simplification step further comprising a step of saving each round of simplification as a simplification record.

17. The method of claim 16, further comprising a step of converting the simplification record into a refinement sequence.

18. The method of claim 1, wherein the first termination condition is deduced from a step condition between levels in an user-defined resolution mesh.

19. The method of claim 1, wherein the second termination condition is the coarsest mesh condition defined by an user.

20. The method of claim 19, wherein the second termination condition is the coarsest mesh condition defined by an user.

21. The method of claim 13, wherein the first termination condition is deduced from the a step condition between levels in an user-defined resolution mesh and the second termination condition is the coarsest mesh condition defined by an user.

22. The method of claim 15, wherein the first termination condition is deduced from the a step condition between levels in an user-defined resolution mesh and the second termination condition is the coarsest mesh condition defined by an user.

23. The method of claim 17, wherein the first termination condition is deduced from the a step condition between levels in an user-defined resolution mesh and the second termination condition is the coarsest mesh condition defined by an user.